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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/507,605	02/21/2000	Wen-Ching Yang	RDM98002	1861

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EXAMINER

LEUNG, JENNIFER A

ART UNIT PAPER NUMBER

1764

DATE MAILED: 12/10/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No. 09/507,605	Applicant(s) YANG ET AL.	
Examiner Jennifer A. Leung	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: **a, b, c, d, f** and **g**.
2. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the drawings.

### *Specification*

4. The disclosure is objected to because of the following informalities:
  - Page 5, line 5: -- or central -- should be inserted before “tube 22” for consistency in terminology, as set forth on page 4, line 19.
  - Page 5, line 9: -- or cylindrical discharge -- should be inserted before “tube 18” for consistency in terminology, as set forth on page 4, line 21.
  - Page 5, line 26: -- or conical diffuser -- should be inserted before “plate 16” for consistency in terminology, as set forth on page 4, lines 19-20.
  - Page 6, line 8: “reactor 12” should be changed to -- reactor 10 -- for consistency with the drawings and terminology, as set forth on page 4, line 16.

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- Page 6, line 24: -- or tube -- should be inserted before “22” for consistency in terminology, as set forth on page 4, line 19.

Appropriate correction is required.

5. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### *Claim Objections*

6. Claims 2-3, 10-16 and 18-19 are objected to because of the following informalities.

Appropriate correction is required.

In claim 2, line 3; claim 11, line 2; and claim 12, lines 2-3, -- and/or solids -- should be inserted before “inlet (22)” for consistency in claim terminology, as set forth in claim 1, line 6. Also, in claim 2, line 3, “the cone” should be changed to -- the conical section -- for consistency in claim terminology, as set forth in line 2.

In claim 3, line 2, “the reduced diameter section (16)” should be changed to -- the conical section (16) -- for consistency in claim terminology, as set forth in claim 2, line 2.

In claim 10, lines 1-2; claim 15, lines 1-2; claim 16, lines 1-2, claim 18, lines 1-2 and claim 19, line 2, “the peripheral gas jets (24)” should be changed to -- the plurality of peripheral gas inlet jets (24) -- for consistency in claim terminology, as set forth in claim 1, line 9.

In claim 12, lines 3-4, “the peripheral gas inlets (24)” should be changed to -- the plurality of peripheral gas inlet jets (24) -- for consistency in claim terminology, as set forth in claim 1, line 9.

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In claim 13, “the respective peripheral jets (24)” should be changed to -- the respective plurality of peripheral gas inlet jets (24) -- for consistency in claim terminology, as set forth in claim 1, line 9.

In claim 14, “the peripheral gas jet (24) inlets” should be changed to -- the plurality of peripheral gas inlet jets (24) -- for consistency in claim terminology, set forth in claim 1, line 9.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, “the reaction “ (line 5), “the raw materials” (line 8) and “the entrained materials” (lines 11-12) lack proper positive antecedent basis. Furthermore, it is unclear as to the structural limitation the applicants are attempting to recite by lines 6-8, “a central gas and/or solids inlet (22)... for directing gas” only, since the inlet directs both gas and/or solids.

In claim 3, it is unclear as to the structural relationship of “a residue collection port (32)” (line 4) to the other elements of the apparatus. Furthermore, “the reaction process” (line 4) lacks proper positive antecedent basis.

In claim 7, “gas within the collection housing (18)” (lines 2-3) and “residue agglomerates” (lines 4-5) lack proper positive antecedent basis.

In claim 9, “the given size” (line 3) lacks proper positive antecedent basis.

In claim 11, it is unclear as to the structural relationship of “a solid or perforated diffuser section” (line 3) to the other elements of the apparatus.

In claim 12, the language of the claim is directed to a method limitation which renders the claim vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite by lines 1-5, since “the fluidizing gas” is not an element of the apparatus. Furthermore, “the fluidizing gas” (lines 2, 3, 4) lacks proper positive antecedent basis.

In claim 13, it is unclear as the structural relationship of “control valves (27)” to the other elements of the apparatus.

In claims 19 and 20, the language of the claim is directed to a method limitation which renders the claim vague and indefinite as it is unclear as to what structural elements the applicants are attempting to recite, since “the pressure drop” is not an element of the apparatus.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 6-10, 12, 14-15, and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sowards (U.S. 4,075,953).

With respect to claim 1, Sowards discloses a fluidized bed reactor (entire reference; especially FIG. 1, 10) comprising:

- A hollow, elongated, vertically oriented reactor housing **26** or **162**;
- A central gas and/or solids inlet **37** or **184**, **186** proximate the bottom of a reaction zone **30** or **172** within the housing **26** or **162**; and

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- A plurality of peripheral gas inlet jets **115** positioned at least two elevations along the elongated dimension of the housing **26** or **162**.

With respect to claim 2, Sowards (FIG. 10) further discloses the reactor housing **162** has a conical section in its reaction zone with the reduced diameter of the cone at its lower end interfacing with the central gas inlet **184**, **186** (see reduced diameter section located above duct **186** and below effluent end **206**).

With respect to claim 3, Sowards (FIG. 10) further discloses a residue collection housing **190** mating at one end with the reduced diameter section of the housing **162** and having an inclined lower wall for directing residue from the reaction process to residue collection port **192**.

With respect to claim 4, Sowards (FIG. 10) further discloses a feeder **194** positioned at the residue collection port **192** for removing residue from the collection housing **190**.

With respect to claim 6, Sowards (FIG. 10) further discloses the feeder **194** continuously removes the residue from the reactor during operation (column 9, lines 35-50).

With respect to claim 7, Sowards (FIG. 5, 10; column 5, lines 40-52) further disclose a sparger **47** surrounding at least a portion of the collection housing **190** for introducing gas within the collection housing to maintain residue below a given size in suspension and directed back into the reaction zone while enabling residue agglomerates above the given size to drop towards the collection port **192**.

With respect to claim 8, Sowards (FIG. 5, 6, 8; column 5, line 40 to column 6, line 21) further disclose the sparger gas **47** is introduced at a downwardly directed angle to the central axis of the collection housing (via air discharge port **75** in FIG. 6 or bores **87** in FIG. 8).



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With respect to claim 9, the lower wall of the collection housing is inclined such that residue may pass to the collection port via gravity, and therefore the apparatus meets the claim (FIG. 10; column 9, lines 28-56).

With respect to claim 10, Sowards (FIG. 1, 2, 3, 10) further discloses the peripheral gas jets **115** are directed at a downward angle to a line perpendicular to the central axis of the reactor housing (column 6, lines 66 to column 7, line 2).

With respect to claims 12, the apparatus of Sowards comprises substantially the structural elements as claimed. Since no further structural limitations are recited (the fluidizing gas is not an element of the apparatus), the apparatus thus meets the claim.

With respect to claim 14, Sowards (FIG. 1, 2, 10) further discloses the peripheral gas jet inlets **115** include a plurality of gas jets at each of said elevations respectively positioned around the circumference of the reactor housing.

With respect to claim 15, Sowards (FIG. 2) further discloses the peripheral gas jets **115** at each elevation are equidistantly positioned around the circumference of the reactor housing.

With respect to claims 19 and 20, the apparatus of Sowards comprises substantially the structural elements as claimed. Since no further structural limitations are recited (the pressure drop is not an element of the apparatus), the apparatus thus meets the claim.

Instant claims 1-4, 6-10, 12, 14-15, and 19-20 read structurally on the apparatus of Sowards.

9. Claims 1-2, 14-15 and 18-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Golant et al. (U.S. 4,532,155).

With respect to claim 1, Golant et al. disclose a fluidized bed reactor **10** (FIG. 1-4; column 3, line 10 to column 4, line 52) comprising:

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- A hollow, elongated, vertically oriented reactor housing **12**;
- A central gas and/or solids inlet **24** proximate the bottom of a reaction zone within the housing; and
- A plurality of peripheral gas inlet jets **34** positioned at least two elevations along the elongated dimension of the housing **12**.

With respect to claim 2, Golant et al. (FIG. 1) further disclose the reactor housing **12** has a conical section in its reaction zone with the reduced diameter of the cone at its lower end interfacing with the central gas inlet **24**.

With respect to claim 14, Golant et al. (FIG. 2, 3) further disclose the peripheral gas jet inlets **34** include a plurality of gas jets at each of said elevations respectively positioned around the circumference of the reactor housing **12**.

With respect to claim 15, Golant et al. (FIG. 1-4) further disclose the peripheral gas jets **34** at each elevation are equidistantly positioned around the circumference of the housing **12**.

With respect to claim 18, Golant et al. (FIG. 2, 3) further disclose the peripheral gas jets **34** are positioned at at least three elevations.

With respect to claims 19, the apparatus of Golant et al. comprises substantially the structural elements as claimed. Since no further structural limitations are recited (the pressure drop is not an element of the apparatus), the apparatus thus meets the claim.

Instant claims 1-2, 14-15 and 18-19 read on the apparatus of Golant et al.

10. Claims 1-2, 14-16 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Heath et al. (U.S. 3,661,558).

With respect to claim 1, Heath et al. disclose a fluidized bed reactor 10 (FIG. 1; column 2, line 37 to column 4, line 16) comprising:

- A hollow, elongated, vertically oriented reactor housing 12;
- A central gas and/or solids inlet 30 proximate the bottom of a reaction zone within the housing 12; and
- A plurality of peripheral gas inlet jets 32 positioned at least two elevations along the elongated dimension of the housing 12.

With respect to claim 2, Heath et al. (FIG. 1) further disclose the reactor housing has a conical section 22 in its reaction zone with the reduced diameter of the cone at its lower end interfacing with the central gas inlet 30.

With respect to claim 14, Heath et al. (FIG. 1) further disclose the peripheral gas jet inlets 32 include a plurality of gas jets at each of said elevations respectively positioned around the circumference of the reactor housing 12.

With respect to claim 15, Heath et al. (FIG. 1) further disclose the peripheral gas jets 32 at each elevation are equidistantly positioned around the circumference of the reactor housing 12.

With respect to claim 16, Heath et al. (FIG. 1) further disclose the peripheral gas jets 32 at each elevation are not aligned with the jets at the other elevations.

With respect to claims 19, the apparatus of Heath et al. comprises substantially the structural elements as claimed. Since no further structural limitations are recited (the pressure drop is not an element of the apparatus), the apparatus thus meets the claim.

Instant claims 1-2, 14-16 and 19 read structurally on the apparatus of Heath et al.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards (U.S. 4,075,953) in view of Grill et al. (U.S. 3,989,446).

Sowards is silent as to whether the feeder may be a screw or rotary feeder. However, Sowards (FIG. 10; column 9, lines 28-65) discloses the purpose of the feeder 194 is for conveying material that is discharged from the collection housing 190 to a remote location or back into the reactor. Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select a screw feeder for the feeder in the apparatus of Sowards because the use of screw feeders for the purpose of conveying material from a reaction zone is conventional knowledge in the art, as evidenced by Grill et al. The apparatus of Grill et

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al. (FIG. 1; column 2, lines 37-51) comprises a reactor **1** wherein material falls by gravity into the conical bottom **6** of the reactor **1** and is then removed through an outlet by screw conveyor **7**. In any event, it has been held that the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards (U.S. 4,075,953) in view of Newby (U.S. 4,766,388).

Sowards is silent as to the gas from the central gas inlet being introduced into the reaction zone without passing through a solid or perforated diffuser section.

Newby (FIG. 6-9) teaches a fluidized bed reactor **201** comprising a central gas inlet **219** proximate the bottom of the reaction zone within the housing for directing gas parallel to the vertical axis of the housing to maintain the materials **215** in suspension. The gas is introduced into the reaction zone without passing through a solid or perforated diffuser section.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the apparatus of Sowards such that the gas from the central gas inlet is introduced into the reaction zone without passing through a solid or perforated diffuser section, since arrangement of the central gas inlet as such bypasses the fluidized bed gas distributors (i.e. diffusers), which are often prone to deposition, plugging and mechanical failure due to contact with the waste gases and contaminants therein (column 1, lines 24-56).

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards (U.S. 4,075,953) in view of Annen et al. (U.S. 5,423,133).

Although Sowards is silent as to control valves for individually controlling the quantity of gas passing through the respective peripheral jets, it would have been obvious for one of ordinary skill in the art at the time the invention was made to provide control valves to the individual peripheral jets in the apparatus of Sowards, since the use of control valves for controlling the addition of gas to a reactor is conventional knowledge in the art, as evidenced by Annen et al. The apparatus of Annen et al. (Figures; column 5, line 47 to column 6, line 12) comprises a chamber **10** wherein a plurality of gas feed pipes **22**, for feeding nozzles **20** with nitrogen gas, are each provided with a flow control valve (not shown) for regulating the flow rate of gas into the chamber. Annen et al. teach that the individual control valves allow the gas to be uniformly brought into contact with the material in the chamber, thereby markedly improving the fluidization efficiency.

14. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards (U.S. 4,075,953) in view of Heath et al. (U.S. 3,661,558).

Although Sowards is silent as to the placement of the peripheral gas jets such that they are not aligned with the jets at the other elevations, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to align the peripheral gas jets as such, as evidenced by Heath et al. The apparatus of Heath et al. (FIG. 1; column 2, lines 52-62; column 4, lines 4-16) comprises a reactor housing **10** wherein a plurality of gas jets (i.e. feed guns **32**) are positioned around the periphery of the reactor such that the jets are not aligned with the jets at other elevations. Heath et al. teach that such arrangement of gas jets helps attain a

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uniform distribution of the feed over the fluidized bed. In any event, shifting location of parts was held to have been obvious. *In re Japikse*, 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950).

15. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards (U.S. 4,075,953).

Although Sowards is silent as to the feeder removing the residue from the reactor in batches during operation, the feeder as disclosed is capable of removing residue in batches since it is conventionally known in the art that a feeder may be stopped and again resumed (thus assuming batch operation), and therefore the apparatus of Sowards meets the claim. In any event, it has been held that it is within the level of ordinary engineering skill to convert a process from continuous to batch. *In re Dilnot* 138 USPQ 248 (CCPA 1963).

16. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sowards (U.S. 4,075,953) in view of Golant et al. (U.S. 4,532,155).

Although Sowards is silent as to the placement of peripheral jets at at least three elevations, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to position the jets as such, absent showing unexpected results, as evidenced by Golant et al. The apparatus of Golant et al. (column 3, line 61 to column 4, line 51) comprises a reactor housing 12 wherein a plurality of jets (i.e. openings 34) are provided for directing air into the reactor housing 12. Golant et al. teach that a plurality of sets of openings, at least two, preferably four or more, are desired for propelling the solid particles and maintaining circulation in the chamber. In any event, duplication of part was held to have been obvious. St.

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Regis Paper Co. v. Beemis Co. Inc. 193 USPQ 8, 11 (1977); In re Harza 124 USPQ 378 (CCPA 1960).

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951.

The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung *JAL*  
December 3, 2002

*Hien Tran*

**HIEN TRAN  
PRIMARY EXAMINER**